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States Government

Department of Energy

DATE

Memorandum

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Rocky Flats Office

ACTION

DIST.	LTR	ENC
BENJAMIN A		
BERMAN, H S		
BRADY, J A		
BRANCH, D B		
CARNIVAL, G J		
COPP, R D		
CORDOVA, R C		
DAVIS, J G		
EVERED, J E		
FERRERA, D W		
GOODWIN, R		
HANNI, B J		
HEALY, T J		
HILBIG, J G		
IDEKER, E H		
KERSH, J M	X	X
KIRBY, W A		
KRIEG, D		
KUESTER, A W		
LEE E M	X	X
MARX, G E		
MORGAN, R V		
PIZZUTO, V M		
POTTER, G L		
SANDLIN, N B		
SATTERWHITE, D G		
SCHUBERT, A L		
SHEPLER, R L		
SULLIVAN, M T		
SWANSON, E R		
IAN K G		
INSON, R B		
WILSON, J M		
ZANE, J O		
Arndt M	X	X
Motyl K	X	X
Busby W	X	X
Levin M	X	X
Wetherbee G	X	X

2 1992

EC&G
ROCKY FLATS PLANT
CORRESPONDENCE CONTROL

RPD JLP 9718

OU5 and OU6 Technical Memorandums Comments

J M Kersh, Associate General Manager
Environmental and Waste Management
EG&G Rocky Flats, Inc

Comments on the draft Technical Memorandum No 1 (Tech Memo) for OU5 and OU6 are attached for your review. These comments pertain to the document that EG&G prepared internally and delivered to DOE on June 23, 1992. We required an extended period of time to prepare these comments because the draft Tech Memo has significant deficiencies. Considering the amount of time that was available for the development of this draft, we are markedly disappointed in the quality.

DOE is providing these comments to clarify the deficiencies in the draft document. Although we do not request an internal rewrite of the Tech Memo, we do request that EG&G convene a meeting of the managers responsible for this document. Since other Operable Unit programs will require similar work in the future, we would like to determine the reasons why this Tech Memo did not meet expectations. EG&G should approach this meeting as a working group designed to evaluate the problem and implement solutions. Please schedule this meeting and concur on an agenda with Jen Pepe at extension 2184.


James K Hartman
Assistant Manager
for Environmental Management

Attachment

cc w/o Attachment.
E Lee, EG&G
M Arnt, EG&G
K Motyl, EG&G
W Busby, EG&G
M Levin, EG&G
G Wetherbee, EG&G
G Litus, EMB, RFO

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Reviewed for Addressee
Corres. Control RFP

9-3-92

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ADMIN RECORD

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COMMENTS ON THE DRAFT TECH MEMO FOR OU5 / OU6

GENERAL COMMENTS

Data

All data should be included in the appendix by using a diskette in a conventional format

Once again, all available information was not included as part of an EG&G document. The memo ERD JLP 1980 specifically requests the use of all available reports and raw data. This Tech Memo did not reference the Master Drainage Study, The Zero Discharge Study, or Steve Petus' report on plutonium concentrations in the terminal ponds. Data from storm event monitoring, toxicity monitoring, stratification monitoring, and sediment sampling were not used. These sources are only a partial listing of information that was not used to produce a complete Tech Memo.

Content and Logic

There is very little original work in this document. The document is a compilation of information without logically presented interpretations.

The writing style is not objective (high enough concentrations, infrequently observed, there are few contaminants).

Conclusions made in this document are not defended by a thorough presentation of supporting information. For example, the document claims that no additional water sampling is needed for the terminal ponds but does not offer supporting evidence. While DOE agrees with the conclusion, there must be a logical presentation of factual data and theory that would lead to this.

A variety of interpretive methods exist that could be used to better understand water quality variations in the ponds. EG&G has used time series analysis and relationship correlations in other reports and studies. This Tech Memo is limited to simple population means that do not begin to fully utilize the data available.

Pond Hydrology

The sections on pond hydrology are merely a verbal summary of Figure 2. During repeated meetings with EG&G, DOE conveyed the need for a detailed understanding of pond hydrology before data could be applied toward characterization. A case can be made that majority of data collected to date does not adequately represent the larger ponds. Concluding that the terminal ponds are completely characterized will require a description of pond morphometry that supports previous sampling programs.

SECTION SPECIFIC COMMENTS

1.1 Purpose

The purpose is misstated. DOE has not concluded that the current work plans will require us to perform additional data collection in the future. We have concluded that the existing data has not been utilized effectively. Our premise is that existing data may or may not fulfill the requirements of the IAG. This information must be interpreted before additional samples are collected.

The purpose of this document is to

Present a detailed work plan that will further characterize the surface water and sediment quality in the ponds. This work plan will supersede the existing surface water and sediment sampling plan for OU5 and OU6 RFI/RI Work Plans

Assure that the final work plan supports the risk assessment

Supply Standard Operating Procedures for proposed activities

Enabling objectives that support the document purpose are

Interpret existing data from all surface water and sediment sampling programs and utilize this interpretation to support the requirements of the IAG. The data interpretation may reduce, increase, or otherwise change the OU5 and OU6 sampling plan. In addition the results of a thorough data interpretation may identify conditions that warrant further study not detailed in the IAG. Any digressions from the IAG that better support the goals of the RFI/RI will be part of the Tech Memo

Develop an understanding of the surface water hydrology in each drainage. Assumptions based on stream hydrology, pond morphometry, and artificial controls will determine if the data collected to date can appropriately characterize the surface water

Develop an understanding of sediment deposition in the pond system

Develop an understanding of stream/groundwater interaction and propose additional work if warranted

1.3 Goals

This section does not add anything to this document. The goals stated in the first sentence are a poor reiteration of purpose.

Examples of goals that will help achieve purposes stated above are as follows:

- Compilation of all data and information on surface water and sediments
- Development of time series plots for all contaminants found for each media
- Provide statistical summary of data based on analyte and location.
- Determine morphometric characteristics that will group the ponds based on similarities
- Identify the thickness of sediment accumulation using the survey recently performed
- Evaluate the impacts that artificial controls have on the hydrology of each drainage. This includes groundwater/surface water interaction, sediment distribution during storm events, etc

2.0 Detention-Pond Water Sampling

Rather than stating the exceptions, this section should state the ponds that apply. An uninformed reader might think that other detention ponds located around the plant might be included in the study area.

2.01 OU 5 Pond Hydrology and Monitoring

This section does not begin to address the hydrology of the Woman Creek Drainage and it does not mention the monitoring that has taken place in the past. This Tech Memo includes a section

on stream sampling, however, the hydrology section only mentions the ponds. If this Tech Memo will include both the ponds and the streams then a discussion on stream and pond hydrology and their relationship must be included.

At least two studies have been done that could contribute to the understanding of Woman Creek hydrology. They are the Master Drainage Plan and the Zero Discharge Study. Neither of these documents are referenced in the Tech Memo so it is assumed they were not used. Below is a partial listing of important issues that are necessary for a preliminary understanding of the drainage hydrology.

- Pond morphometry such as capacity, shape, and depth
- Channel morphometry such as length, width, elevation loss, tortuosity, etc
- Pond limnology, including identification of stratified zones due to temperature, conductivity, or oxygen gradients.
- Creek flow rates based on season and artificial controls
- C1 retention time, C2 discharge histories
- Drainage segmentation that locates water contributions from contaminant sources
- Sedimentation rates based on actual accumulation or modeled drainage erosion
- Water balance using gaging station information, meteorological information, and engineering studies currently available
- The relationship of storm event flows to other hydrologic characteristics

2.02 OU 6 Pond Hydrology and Monitoring

The same comments for section 2.01 apply to 2.02. Additionally, a more detailed description of pond management practices is important. This chronology of management practices should include historical releases to the spill control ponds, evaporation and irrigation practices, and transfer protocols.

Unlike the Woman Creek Drainage, Walnut Creek has segments that are impacted by the plant in different ways. The differences in each of these north and south segments should be described in detail.

Discharge approvals are irrelevant to the understanding of OU6 hydrology.

The summary of monitoring programs in Table 1 is not appropriate. Rather than state what the current program entails, a matrix of past activities is more appropriate. This matrix would list the sites, frequency, duration, and parameter suite associated with the various projects. In addition, a description of the amount and value of the data collected from each project should be included.

2.03 Terminal Pond Water-Quality Data Analysis (these comments also apply to section 2.04)

The summary statistics appear to be an update of the data and methodology used for the "Evaluation of Surface Water Quality for Rocky Flats Plant Terminal Ponds A-4, B-5, and C-2". That document was used to evaluate the water in the terminal ponds for discharge purposes and does not directly apply to characterization of the ponds for an RFI/RI. The large quantities of analysis performed on treaty water (Between GAC Filters) is important to the discharge process. However, this data is not relevant to pond water characterization.

The statistical summary method exclusively uses data population means. Pond characterization for an RFI/RI should be more comprehensive. Additional work should include time-series analyses that identifies seasonal variations in pond water quality, pond vs. pond comparisons that may help identify contaminant contributions from clusters of IHSSs, and depth specific analysis.

Time series analysis should include a variety of correlations. Storm events and pond level fluctuations are examples of conditions that may greatly affect pond water quality. Indicator parameters such as specific conductance, dissolved oxygen, or alkalinity may be useful for the interpretation of water quality. Also, depth specific data, while limited, may help identify conditions that warrant further investigation.

Other specific problems associated with the summaries of data are as follows:

- No discussion exists on the terminology used to describe "Pre-GAC Filters". This data may be usable since it was collected before carbon treatment but after filtration.
- Sodium Nitrite results may be a mistake since samples were not specifically analyzed for that compound.
- Many compounds are listed as having some number of detects, however, the maximum concentration is listed as undetected.
- The text states that atrazine and simazine are the only compounds of concern, however, there are detects for Chromium VI and VOCs.
- The highest concentrations of atrazine in A4 and B5 are around 4 ug/L. The summary shows levels as high as 2610 ug/L.
- The summary lists TIC as a compound below detection limits. Tentatively Identified Compounds should not be listed in this manner.

2.0.4 Non-Terminal Pond Water Quality Data Analysis

The use of subjective descriptions is excessive in this section:
acceptable for most uses
few contaminants of concern
major contaminants of concern
well below the RFP discharge standard
activities are low but elevated compared to
is found consistently in Pond

The majority of the contaminants listed are reported in sub-ug/L levels. This is the result of using analytical method 502.2. A discussion on this method and the relevance of these extremely low values must be included. Also, samples of interior pond water have been collected for at least the last 2 years. These samples indicate contamination in pond B2 that is an order of magnitude higher than the levels listed in the text. This contamination is suspected to be migrating off the east trench area and is common knowledge to most individuals at EG&G working in this area. This data should be incorporated into this document and further studies designed to identify the source should be proposed.

2.0.5 Water Sampling Plan for OU6 Non-Terminal Ponds

The statement that we have collected more water quality data than required by the IAG is a misrepresentation of the data. The IAG calls for a characterization of the ponds that includes areal and depth specific coverage. The data collected to date are from grab samples collected at the pond banks. To demonstrate that the data collected fulfills the requirements of the IAG, assumptions based on pond hydrology are required. Since an understanding of the pond hydrology is not discussed in this Tech Memo, the statement that additional work is not needed is premature.

The discussion of internal problems associated with the turn around time for radionuclides is inappropriate. This Tech Memo is not a forum to present excuses for unresolved problems. The

data that is available should be used. Data that is not readily accessible through RFEDS should be tracked down in hard copy and not deferred to Phase I RFI reports.

Conceptual models should be presented in this document. If additional data collection is not required, and enough data is available to immediately start conceptual model development, why aren't those models presented in this Tech Memo? If completion of conceptual models is not within the scope of this document, the details on how the development will proceed should be presented.

This section recommends that additional work be performed to, 1) identify mechanisms for transport of contaminants into the detention ponds and 2) determine equilibrium partitioning between the water column and sediments. The purpose of this Tech Memo is to develop a better workplan. Instead, this Tech Memo suggests additional work but defers this work to the RFI report. The logic associated with this is difficult to follow. If additional work is needed it must be performed before the RI report is completed and the plan to do that work should be in this Tech Memo. If no additional work is needed then this Tech Memo should establish that argument by interpreting the available data and formulating conclusions on the characteristics of the ponds.

2.0.6 Pond C-1 Water Sampling for OU5

The first sentence states that chemical data is available for only one sample collected from C-1. However, a cursory query of RFEDS shows that samples were collected for 6 consecutive months in 1991. If this data cannot be retrieved, hard copy of the results should be requested from the data validation contractor. Results from samples collected as part of the NPDES program are also available from the EG&G Surface Water Division.

Based on the argument of short residence time, the Tech Memo precludes the need for samples from multiple locations in C1. What are the variations in residence time based on Woman Creek flows? Recent observations of almost no flow indicate that residence time in the summer may exceed 4 days.

As a Tech Memo, the described action is dramatically incomplete. The Tech Memo states that five samples will be collected from the same location in C1 during different hydrologic conditions. Specifically, what are these different conditions? Will the samples be grab or depth composited? Is there a limiting time frame associated with sample collection? How will these samples correlate with the sediment / water interface described earlier in the Tech Memo?

2.0.7 Pond Stratification

The first sentence acutely contradicts the conclusions of sections 2.0.4 and 2.0.5. The past sections state that additional sampling is not needed to further characterize the ponds. This section says that the original work plan will be followed except that depth specific samples may be required. The original plan requires the collection of samples from five locations in each pond. Which section is correct?

If after a complete interpretation of the pond conditions we decide that the original plan is appropriate, what are the specific conditions that will indicate a stratified pond. The text discusses a defined epilimnion and hypolimnion. These terms are usually associated with thermal stratification. What level of accuracy will be used to identify these layers? What temperature gradient indicates stratification? Do haloclines (chemical stratification identified by specific conductance) also initiate depth specific sampling? How will eutrophic conditions affect the sampling? How will stratification be handled if there are more than two layers? What sampling will be initiated if stratification is limited to local areas in any single pond?

2 1 1 Number of Samples

EG&G indicated during the development of this Tech Memo that one uniform sampling scheme for all ponds was inappropriate. This was based on the large size and shape variation of the ponds and the fact that a small population of random samples (3) will not determine a statistical distribution of sediments. This discussion is not represented in the Tech Memo.

The Tech Memo states that the area of thickest sediment accumulation is assumed to be in the deepest part of the pond. Sampling performed earlier this year may refute that assumption. Ponds A4 and B5 had less than 8 centimeters of sediment accumulation in the deepest part of the pond located near the valve works. This may be associated with sediment settling in the upstream ponds rather than the terminal ponds. Another explanation is that discharges through the valve works may have discharged sediments along with the water. The question can be easily answered by effectively using the pond bottom survey performed under the direction of the Surface Water Division.

The pond bottom survey was apparently used to generate Table 4 in this Tech Memo. Bulk sediment volumes do not support the purpose of the pond sediment characterization. Rather, contours of the pond bottoms should be compared to the design contours so that sediment thicknesses can be determined prior to additional field work. The Tech Memo requires estimating these sediment thicknesses using data collected prior to the RFI. Is that data from the pond bottom survey? If not, when and how will that data be collected? This Tech Memo is supposed to clarify the work plan and not propose work that is poorly defined.

The Tech Memo states that detailed analysis on five centimeter intervals for core samples shorter than 30 centimeters is questionable. What is meant by questionable? If the cores are 25 centimeters long, are the results still questionable?

2 1 2 Gamma Scans for Pond Sediments

Analyzing samples for "total gamma activity" may not be the best method for core analysis. The results of such a study would be similar to gross alpha and gross beta counts. These indicator analyses are only useful in determining if upset conditions exist that warrant further detailed analysis. A more productive use of gamma spectroscopy is to produce a detailed spectrum that would allow the radiochemists to identify isotope specific radionuclides. Selected samples could then be analyzed using isotope specific alpha spectroscopy to further define the levels of specific radionuclides in the sediments.

One major concern that this Tech Memo does not address is whether these samples will be analyzed on-site or off-site. The use of on-site capabilities to perform the gamma spectroscopy is the most cost effective. However, the hardware, personnel, and procedures required for this program may not be available to support the scheduled field programs. If these samples are going to be analyzed off-site the costs may be prohibitive. In addition the Tech Memo does not show how these analytical results will correlate with other composited core samples or support the RFI/RT's in general.

2 1 3 Representative Sampling to Achieve Analysis Objectives

All measurements in the Tech Memo should be discussed with consistent units (either centimeters or inches).

2 2 1 Sitewide Surface Water Monitoring and Work Plan Requirements

The second paragraph discusses the rationale for reducing the sitewide program to 82 stations. Without additional rationale the Tech Memo states that the current program consists of 20 sites. An explanation of this further evolution of the program is warranted.

The last two paragraphs of this section discuss how the sitewide program does not lend to the evaluation of contaminant contributions from IHSSs. This may be true if the results of the many samples collected show erratic concentration of contaminants that vary with different hydrologic conditions. However, a thorough review of data from the site wide and storm event programs may show that many areas of RFP do not contribute detectable contaminants to the surface water. Contaminant loading has no relevance if there is no contamination.

This section of the Tech Memo adds nothing to the original Workplans since an interpretation of the existing data was not performed.

2 2 2 Event -Related Surface Water Monitoring

The network of gaging stations has been in place as temporary structures for more than a year. The Tech Memo states that this network will be used for the OU5 and OU6 RIs. What are the results from a year of sampling? Do these results indicate that different locations or additional monitoring sites are appropriate for the OU RIs? How many storm events will be sampled for the RIs? Since most of the surface water on-site is artificially controlled, what constitutes an event? Which sections of the plant will be monitored by each gaging station? How do the IHSSs of concern potentially contribute to these drainage basins? These questions are vital to the Tech Memo and since the data were not reviewed and supporting studies were not consulted they cannot be answered.

2 2 2 1 Estimation of Contaminant Loading

Figure 6 and the associated text implies that each individual IHSS will be monitored by the gaging station network. In fact the OU5 and OU6 IHSSs will be monitored in clusters along with IHSSs from other operable units that contribute storm water runoff into Walnut and Woman Creek. Again, a thorough review of existing gaging station data may indicate areas in OU5 and OU6 where tighter sampling resolution is important.

The second paragraph on page 38 states that current meters will be used to obtain flows from sampling locations that are not gaged. The Tech Memo states on page 35 that the monitoring network will be used for the OU5 and OU6 RIs. Where are the sampling locations that are not gaged? Why are they not described in the Tech Memo?

2 2 2 2 Toxicity Testing

Some data already exists that correlates toxicity with chemical data for the terminal ponds and SW001 and SW003. This data should be presented and interpreted before additional sampling is proposed. Will the sediment toxicity sampling proposed include chemical analysis for both the water and sediment phase?

Bullet number 6 on page 42 states that sediment toxicity samples will be collected for baseflow and event-related flows. More detail is needed to explain this program.

Appendix 3 - SOPs

A procedure for the collection of sediment toxicity samples in both ponds and streams does not exist.

5-21000-OPS-SW 17 Pond and Reservoir Bottom Sediment Sampling

Section 6.2 Pond Bottom Sediment Coring is inadequate for the collection of the 5 centimeter interval samples. During a sampling event on May 4, 1992 this procedure was implemented. The result was an awkward collection of sediments that produced a homogenous slurry in pond C-2. This is not acceptable. Paine (1974) indicates that discrete intervals of pond sediments may have significant concentrations of plutonium. Sampling at A-4 was also awkward due to the weight associated with the sampler and 4 extension rods and the constant movement of the small boat used.

This procedure does not describe how samples deeper than two feet will be collected at any single location. The Tech Memo proposes two foot composites for all but the thickest core. The interval from 2 feet to sediment bottom will be very difficult to collect if some type of casing is not used.

Appendix 7 - Stream Aquifer Interaction

This section appears to be a simplistic summary of the work performed by Andis Berzins in the Woman Creek Drainage. The last sentence of this section states that the OU5 RFI/RI should consider further inquiry into stream and aquifer interaction. The purpose of this Tech Memo is to supply a work plan for all further data needs. Shifting further action to some unspecified document is contradictory.

Pond B2 is contaminated with volatile organic compounds. A possible source for these contaminants is the East Trench area located in OU2. An investigation to determine the hydraulic connection between B2 and colluvial groundwater should be proposed.